

## **REMARKS**

### **The Amendments**

Claim 1 has been amended to more particularly point out and distinctly claim the subject matter applicants regard as the invention. As noted in the Office Action, the proviso was unclear about which moieties the range of carbon atoms referred to. Therefore, claim 1 has been amended to clarify this point. This amendment is supported throughout the specification in the representative, preferred, and exemplified species. In particular, all of the examples of two-component mixtures contain 5 (example 34) or fewer carbon atoms in the relevant moieties, and the examples of three-component mixtures contain 7 (example 18) or fewer carbon atoms in the relevant moieties. Thus, this information clarifies the recitation found in the claim and in the specification.

Claim 1 also has been amended to eliminate the recitation of a range within a range.

New claim 15 has been added to address the ‘range within the range’ deleted from claim 1.

Applicants respectfully submit that these amendments add no new matter to the application and earnestly solicit entry thereof.

Claim 1 also has been amended to clarify that the cycloalkane-alkyl or -polyalkyl components and the aliphatic hydrocarbons are saturated. This amendment is supported throughout the specification, particularly in the representative, preferred, and exemplified species. All of these compounds are saturated.

Applicants respectfully submit that these amendments add no new matter to the application and earnestly solicit entry thereof.

**The Office Action**

Claims 1-14 were pending and examined.

Claim 1 stands rejected under 35 U.S.C. § 112, second paragraph, as indefinite for failure to particularly point out and distinctly claim the subject matter applicants regard as the invention. The Office Action identified the proviso as unclear about which moieties the range of carbon atoms referred to. The Office Action also pointed out that the temperatures relating to the cloud point constituted an impermissible range within a range.

Claims 1-6 stand rejected under 35 U.S.C. § 102 (b) as anticipated by Hsu, United States Patent Number 6,086,782. In particular, the Office Action identifies a table of terpene derivatives in Hsu and selects a compound that, *if* used with menthane, forms a proposed combination said to anticipate claims 1-6. Another part of this proposed combination is based on myrcene with terpene. [The Office Action identifies ‘terpines,’ but applicants understand this to mean ‘terpene,’ as ‘terpine’ is not a relevant compound and is not mentioned in Hsu.] Other combinations of compounds are identified as meeting the claims. Physical properties are said to be inherent in the heat transfer fluid composition.

Specific combinations are said to disclose the subject matter of claims 2-6.

Claims 7-14 stand rejected under 35 U.S.C. § 103(a) as obvious over Hsu, and further in view of Praller, WO 01/92436. The Office Action identifies particular combinations, describes certain physical properties as inherent, and admits that Hsu does not disclose ranges set forth in claims 8 and 10-14, does not disclose specific compounds recited in claims 9 and 14, and does not disclose a recited limitation. The Office Action further construes a value of a volume ratio of two specific compounds to disclose that value in a weight ratio of other compounds that have ‘comparable size.’

Despite the differences in moieties between the disclosure and the claims, the Office Action asserts that a *prima facie* case of obviousness can be asserted when compounds have close structural similarities and similar utilities.

The Office Action also identifies sections of Praller said to support the position taken in the Office Action. Additional assertions about motivation to combine with a disclosure in Praller also are said to show that the invention would have been obvious.

### **The Cited Documents**

Hsu discloses heat transfer fluid composition comprising a terpene component comprising at least one terpene and at least one alkylbenzene in quantities sufficient to be liquid at temperatures below 0° F to about -175°F. “Terpenes” includes hydrogenated derivatives and acyclic terpenes; a number of suitable compounds are identified in Table 2. Specific examples are limited, and -175°F is the lowest temperature measurable in Hsu’s system. Thus, some temperatures at which the mixture is still liquid are described as “at least -175°F.” This temperature gives no idea of what the freezing point, and so the service temperature, actually is for that combination. None of the examples is directed to a mixture containing more than 1 terpene or more than one alkylbenzene.

Praller is not in the English language. However, applicants’ representative is informed that Praller teaches away from the claimed invention, as it recites that the composition methylcyclopentane can be improved upon by using methyl pentane or analogs thereof. Further, applicants’ representative is informed that Praller does not disclose or suggest mixtures.

### **The Invention**

The invention is directed to a heat transfer fluid for use over a broad range of temperatures. The fluid consists essentially of a component selected from the group consisting of (a) a mixture of at least two structurally non-identical saturated cycloalkane-alkyl or -polyalkyl components, (b) a mixture of, at least, two structurally non-identical saturated aliphatic hydrocarbons having a linear or branched chain with from 5 to 15 carbon atoms; and (c) a mixture of, at least, a saturated cycloalkane-alkyl or -polyalkyl and a saturated aliphatic hydrocarbon having particular carbon numbers.

The cycloalkane moiety of the first mixture contains from 5 to 8 carbon atoms, the alkyl moiety contains from 1 to 6 carbon atoms with the proviso that the total number of carbon atoms in the alkyl moiety(ies) on the cycloalkane-alkyl and cycloalkane-polyalkyl compounds together is in the range of from 1 to 10.

The cycloalkane moiety contains from 5 to 8 carbon atoms, the alkyl moiety contains from 1 to 6 carbon atoms with the proviso that the total number of carbon atoms in the alkyl moiety(ies) on the cycloalkane-alkyl and cycloalkane-polyalkyl compounds together is in the range of from 1 to 10, and a saturated aliphatic hydrocarbon having a linear or branched chain with from 5 to 15 carbon atoms.

The composition has: a cloud point below -100 °C., a vapor pressure, at +175 °C., below 1300 kPa; and a viscosity, measured at the cloud point temperature +10 °C., below 400 cP.

The dependent claims are directed to specific features of the invention.

### **The Invention in view of the Cited Documents**

#### ***Formalities***

Applicants have amended claim 1 to clarify an ambiguity identified in the Office Action relating to the nature of the carbon number limitation in subparagraphs (a) and (c). Now, the claim is clear about the number of carbon atoms of the alkyl moieties.

Applicants also have amended claim 1 by deleting the 'range within a range' relating to

the cloud point. The more-limited range now is recited in new dependent claim 15.

Therefore, applicants respectfully traverse the formal rejection of claim 1 under 35 U.S.C. § 112, second paragraph.

***On the Merits***

Applicants respectfully traverse the pending rejections. Hsu does not disclose the invention as claimed. Hsu neither anticipates claims 1-6 nor makes obvious, alone or in combination with Praller, claims 7-14. Claims 2-15 are dependent, directly or indirectly, from claim 1, and so are allowable at least for the reasons claim 1 is allowable.

**Claim 1**

Claim 1 has been amended to clarify that the cycloalkane-alkyl or -polyalkyl components and the aliphatic hydrocarbons are saturated. The representative, preferred, and exemplified species are saturated. Thus, this clarifies that ‘aliphatic’ in the claim goes to saturated moieties only.

Further, claim 1 also has been amended to clarify the identities of moieties to which the carbon number rule is to be applied. In particular, all of the examples of two-component mixtures contain 5 (example 34) or fewer carbon atoms in the relevant moieties, and the examples of three-component mixtures contain 7 (example 18) or fewer carbon atoms in the relevant moieties. This clarifies which moieties are to be considered when evaluating the carbon number count.

Applicants respectfully traverse the rejection of claim 1 as anticipated by Hsu. The Office Action identifies a proposed combination of two terpenes, menthane and 1,1-dimethylcyclohexane, from lists of components in Hsu, as anticipatory of subparagraph (a). Subparagraph (a) is one of the three parts of the Markush Group. However, this rejection is not

well-founded on two points. First, these two compounds are not used together in Hsu, and, second and more importantly, cannot be used in Hsu as a heat transfer fluid. Rather, this proposed combination could at best be merely one component of a heat transfer fluid of Hsu; the other component required is an alkylbenzene. As this alkylbenzene, which is required in Hsu, is not found in the claimed invention, Hsu cannot anticipate the claims.

The Office Action does not assert that Hsu meets subparagraph (b), the second component of the Markush Group.

Applicants respectfully submit that subparagraph (c) is not anticipated by Hsu, as asserted in the Office Action. As with subparagraph (a), the Office Action asserts that two compounds, myrcene and menthane, meet the limitations of this subparagraph. However, the rejection again suffers on the same two points again. Not only does Hsu not disclose the use of these two compounds together, but also, and more importantly, these two compounds do not form a heat transfer fluid of Hsu, as, again, Hsu requires a combination with an alkylbenzene.

Applicants respectfully submit that Hsu does not anticipate, nor does it suggest, claim 1. Applicants respectfully submit that, the remaining claims being dependent from claim 1, all claims are allowable over Hsu.

Claims 2-6

With regard, in particular, to claims 2-6, applicants respectfully submit that, because Hsu requires an alkylbenzene as a part of the heat transfer fluid, Hsu cannot anticipate the claimed invention. The assertions in the Office Action regarding claims 2-6 do not consider this aspect of Hsu. Further, Hsu does not suggest that any heat transfer fluid can be useful without an alkylbenzene.

Applicants respectfully submit that the other assertions relating to these claims are not

relevant, as they ignore a requirement of Hsu. Applicants respectfully traverse the rejection of claims 1-6.

Claims 7-14

Applicants respectfully traverse the rejection of claims 7-14 as obvious. This rejection suffers from the same important infirmity found in the anticipation rejection, specifically, that Hsu requires an alkylbenzene as a component in Hsu's heat transfer fluid. Therefore, applicants respectfully submit that the assertions relating to these claims are not relevant, as they ignore a requirement of Hsu. Further, the Office Action simply ignores limitations of the claims that are distinct from both Hsu and Praller's disclosure.

To the extent the rejection of claims 7-14 relies on Praller, applicants respectfully submit that Praller teaches away from the claimed invention. We are informed that Praller is directed to an improvement on methylcyclopentane and proposes use of methyl pentane or its analogs. However, Praller does not address mixtures.

Further, applicants respectfully submit that the skilled practitioner would not make the proposed combination. As Praller does not address mixtures, the skilled practitioner would not seek to introduce the compounds of Praller into Hsu. Applicants respectfully submit that the skilled practitioner, seeing Table 2 of Hsu, would not seek to introduce the methyl pentanes and analogs thereof into Hsu.

Still further, applicants respectfully submit that the proposed combination does not yield the claimed invention. The proposed combination requires alkylbenzene as a component in the heat transfer fluid.

For these and the reasons set forth with regard to claim 1, applicants respectfully traverse the rejection of claims 7-14.

## **CONCLUSION**

Applicants respectfully traverse the rejections. The cited documents neither suggest nor disclose the claimed invention, whether considered alone or in the proposed combination. Further, the proposed combination would not be made by the skilled practitioner and, even if made, does not result in the claimed invention. Applicants respectfully submit that the claims are in condition for allowance.

Respectfully submitted,

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Dated: July 2, 2009

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